Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

The observations were made with the 12-inch equatorial, stopped down to three inches, using powers of about 125 and 175. A diagonal, plane-glass reflector was used in front of the eye-piece, and as light a shade-glass as possible.

Thin clouds covered the sky during the observations, but were not sufficiently dense to interfere with seeing the detail of structure in spots.

No evidences, whatever, of the corona were seen.

The contacts were observed as follows:—

First Contact, 1908, June 28.. $2^h\ 20^m\ 39^s$ G. M. T.
Last contact, 1908, June 28.. 4 6 16 "

It was estimated that geometrical first contact occurred two seconds earlier than the above time, which is the time when the contact was certain. The time of the last contact observation is that of the disappearance of the lunar limb, which is practically that of geometrical contact.

A high, gusty wind blew from the north during the observations, weakening somewhat toward the end. The seeing was extremely bad during the early part of the observations, but improved very much before last contact. C. D. PERRINE.

MT. HAMILTON, CAL., June 29, 1908.

THE ORBITS OF THE SPECTROSCOPIC BINARIES β *HERCULIS* AND o *LEONIS.*

β Herculis.—This star was found to have a variable radial velocity by Dr. CAMPBELL in 1899. By September, 1902, a series of thirty-two spectrograms had been obtained at Mt. Hamilton, and a determination of the orbit from this material was undertaken by Dr. H. M. REESE. Before his investigation was quite completed, however, he resigned his position in the Lick Observatory, and left in June, 1903, without preparing his results for publication.

A careful examination of the papers left by Dr. REESE showed that his work had been carried to an advanced stage, and that little was necessary to put it in a final form and to verify that it represented the orbit with satisfactory accuracy at the time when the observations were made. A set of provisional elements had been adopted after some trials, and from the equations of conditions based on these elements differential corrections had been calculated in the usual manner by the method of least-squares. The result of applying these is to give the following final system:—

ELEMENTS OF β *HERCULIS.*

Period, $U = 410.575$ days; $\mu = 2\pi U^{-1} = 0.0153034$
$T =$ J. D. 2415500.374 = 1901, April 25, 9^h, G.M.T.
$e = 0.5498$; $\phi = 33° \; 21'$
$\omega = 24° \; 36'.3$
Velocity of system, $\gamma = -25.52^{km}$
$K = 12.782^{km}$; $V = -19.13 + 12.782 \cos u$

which represent the observations satisfactorily. From them may be deduced

$$a \sin i = 60{,}280{,}000^{km}$$

$$(m + m') \sin^3 i = 0.0519 \; (1 + m/m')^3$$

where m is the mass of the star whose spectrum has been observed and m' the mass of the other star, the Sun's mass being unity.

o Leonis.—The variability in the velocity of this star was discovered by Dr. Campbell in 1898. Its spectrum had previously been described as of composite type by Miss Maury. It is interesting to notice that out of a list of eighteen stars so described by her, eight have now been found to possess a variable velocity in the line of sight. Lines of the second spectrum can be recognized and measured separately on the plates except when the radial velocities of the components are in the neighborhood of the velocity of the system.

A series of thirty-eight plates had been secured in 1898-1900, and three were taken in the present year with the object of improving the period. The eccentricity of the orbit is certainly very small, and a circular orbit has been adopted. The separation of the two spectra makes it possible to determine the ratio of the masses. The results are as follows:—

Period = 14.4980 days
Ratio of masses, $m_1 : m_2 = 7 : 6$
$V_1 = +27.07 + 54.05 \sin \mu \, (t - T)$
$V_2 = +27.07 - 63.06 \sin \mu \, (t - T)$
$T =$ 1899, Jan. 1.477; $\mu = 24°.831$
$a_1 \sin i = 10{,}775{,}000^{km}$, $m_1 \sin^3 i = 1.302$
$a_2 \sin i = 12{,}571{,}000^{km}$, $m_2 \sin^3 i = 1.116$

The comparison of the observations with the results of calculation from these figures shows great irregularities in the measures. The measures can be arranged in order of increasing inaccuracy thus: (1) the measures of component I when II is separately visible, (2) the corresponding measures of component II, (3) the measures of I when II is not separated. Of (1) it may be said that the results are distinctly poor and fall below what is to be expected from a careful measurement of a large number of lines in a single spectrum. The lines of II which can be clearly distinguished on any one plate are few (sometimes no more than two), and comparisons in the second group shows differences which, taken on the whole, must be considered satisfactory under the circumstances. But in the third group the interference between the two superposed spectra has disastrous effects on the accuracy. In view of the fact that spectrum II separately is quite inconspicuous in comparison with I, this is rather surprising, but that the interference of the spectra is the effective cause is clear because the large displacements are all in the direction of the mean velocity of the system. Thus one plate which shows the largest discrepancy gives a measure $+28^{km}$, when it should give $+38^{km}$, for component I. In cases like the one alluded to, the superposition of the two spectra does not affect the appearance of the lines noticeably, although the inconsistency of the individual lines becomes apparent in the measures. It has not proved possible to isolate lines of the first spectrum which are unaffected by the second.

A comparison of the above results has been made with a series of twelve plates obtained in 1905-1906 with the Bonn spectrograph, and discussed by Dr. ZURHELLEN (*Astronomische Nachrichten,* No. 4151). The star is not a suitable one for instituting a comparison, for reasons explained, but there seems to be a satisfactory absence of systematic difference between the Bonn and Mt. Hamilton observations.

May, 1908. H. C. PLUMMER.